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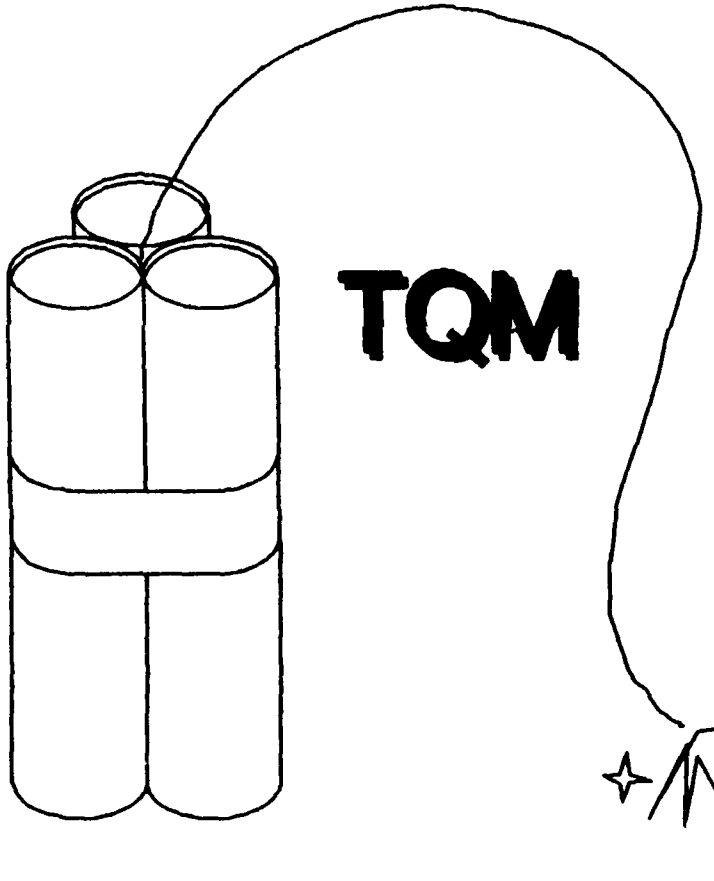
DEFENSE LOGISTICS SERVICES CENTER



TQM

SPARC HANDBOOK

AUGUST 1989

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Commercial 616-961-4854

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	Aug 89	Final

4. TITLE AND SUBTITLE
TQM SPARC Handbook

5. FUNDING NUMBERS

6. AUTHOR(S)

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Defense Logistics Services Center
Quality Assurance Division
74 N. Washington
Battle Creek, MI 49017-3084

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release, distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*
This document describes the techniques used to support and guide the Special Process Action Review Committees for accomplishing their goals for Total Quality Management (TQM). It includes concepts and definitions, checklists, sample formats, and assessment criteria. Keywords: Continuous process improvement, Logistics information, process analysis, Quality control, Quality Assurance, Total Quality Management,

14. SUBJECT TERMS
Quality Improvement, Statistical Processes, TQM (Total Quality Management), Management Planning and Control, Management Training, Management Information Systems. (EG)

15. NUMBER OF PAGES
70

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL

INTRODUCTION

The TQM SPARC HANDBOOK was developed to support and guide the Special Process Action Review Committee. As each process is reviewed, the handbook will be used to assure that all the process reviews are completed with the same continuity.

It is a living document written and maintained by the Quality Assurance Division (DLSC-LQ). This handbook will be updated and improved as needed.

SPARC HANDBOOK

TABLE OF CONTENTS

QUALITY

PRINCIPLES

AND

DEFINITIONS

QUALITY PRINCIPLES AND DEFINITIONS

In this section we have highlighted some of the principles and definitions in **TOTAL QUALITY MANAGEMENT**.

It is a short collection of the more critical ideas important to **TQM**. By placing them at the beginning of the handbook, we are stressing to our Special Process Action Review Committees (**SPARCS**) the importance of the concept and ideas in accomplishing our goals for **TQM**.

SPARC

1. Special Process Action Review Committee
2. Committee is staffed with a facilitator (DLSC-LQ), focal point, leader (process owner) and members.
3. Reviews the work process (input/output) for improvements/problem solving.

FOCAL POINT

1. Central control point in each directorate.
2. Communicates with people throughout the directorate to keep them informed of program activities.
3. Participates in SPARCs on periodic basis to insure consistent implementation within the directorate.

FACILITATOR

1. Teaches the quality improvement process and problem-solving techniques.
2. Coaches the team leaders and members before, during, and after their meetings.
3. Communicates with people throughout the organization to keep them informed of program activities.
4. Promotes the quality improvement process.

LEADER

1. Conducts meetings, leading the team through the problem-solving process.
2. Teaches quality improvement process techniques.
3. Applies the principles of group development and group dynamics.
4. Maintains team momentum.
5. Communicates and coordinates with facilitators.

MEMBERS

1. To solve systemic problems using a systematic problem solving process.

Participants should be highly motivated, highly capable, and enthusiastic. They should have excellent interpersonal skills and have a high degree of credibility among local management and their peers.

CUSTOMER - one who receives the output from a work process.
   a. Internal customers (those within the organization)
   b. External customers (those outside the organization)

SUPPLIER - one who provides the needed product or service.

QUALITY TRILOGY (Dr. Juran)

QUALITY PLANNING - This involves the careful upfront planning of work systems so that chronic waste and error are not built into the system. This is not to say that problems are purposefully built in. However, Juran points out that 80% of our quality problems have their roots in the work systems. In other words, they are systemic in nature. The goal of quality planning is to assure that the design of a system will allow employees to do their jobs right virtually all the time. The incorporation of the quality initiatives into the Strategic Plan is an example of the Service's efforts in quality planning.

QUALITY CONTROL - This is the process of determining if we're meeting our quality goals.

QUALITY IMPROVEMENT - By identifying problems, or areas of improvement, and approaching them with a rigorous and methodical problem solving process, it is possible to arrive at solutions which reduce the level of waste and error in a work system. The result will be an improved system or process which will ultimately save resources for the Service.

THE ONE RIGHT ANSWER (?)

Much of our educational system has taught us to look for the one right answer. This approach is fine for some situations, but many of us have a tendency to stop looking for alternative right answers after the first one has been found. This is unfortunate because often it's the second, or third, or tenth right answer which is what we need to solve a problem in an innovative way.

TIP #1: A good way to be more creative is to look for the second right answer. There are many ways to pursue these answers, but the important thing is to do it. Often the really creative idea is just around the corner.

TIP #2: The answers you get depend on the questions you ask. Play with your wording to get different answers. One technique is to solicit plural answers. Another is ask questions that whack people's thinking.

TWO DISTINCT PHASES TO QUALITY IMPROVEMENT

1. **DIAGNOSTIC JOURNEY** - (Symptom to Cause)
   In this process, observable symptoms of a problem are analyzed to determine the root cause (the true cause of the problem). The purpose of identifying the root cause is to avoid treating symptoms, indicating that the problem is still unsolved.

2. **THE REMEDIAL JOURNEY** - (Cause to Remedy)
   Once the true cause has been identified, a remedy can be selected which should solve and eliminate the problem.

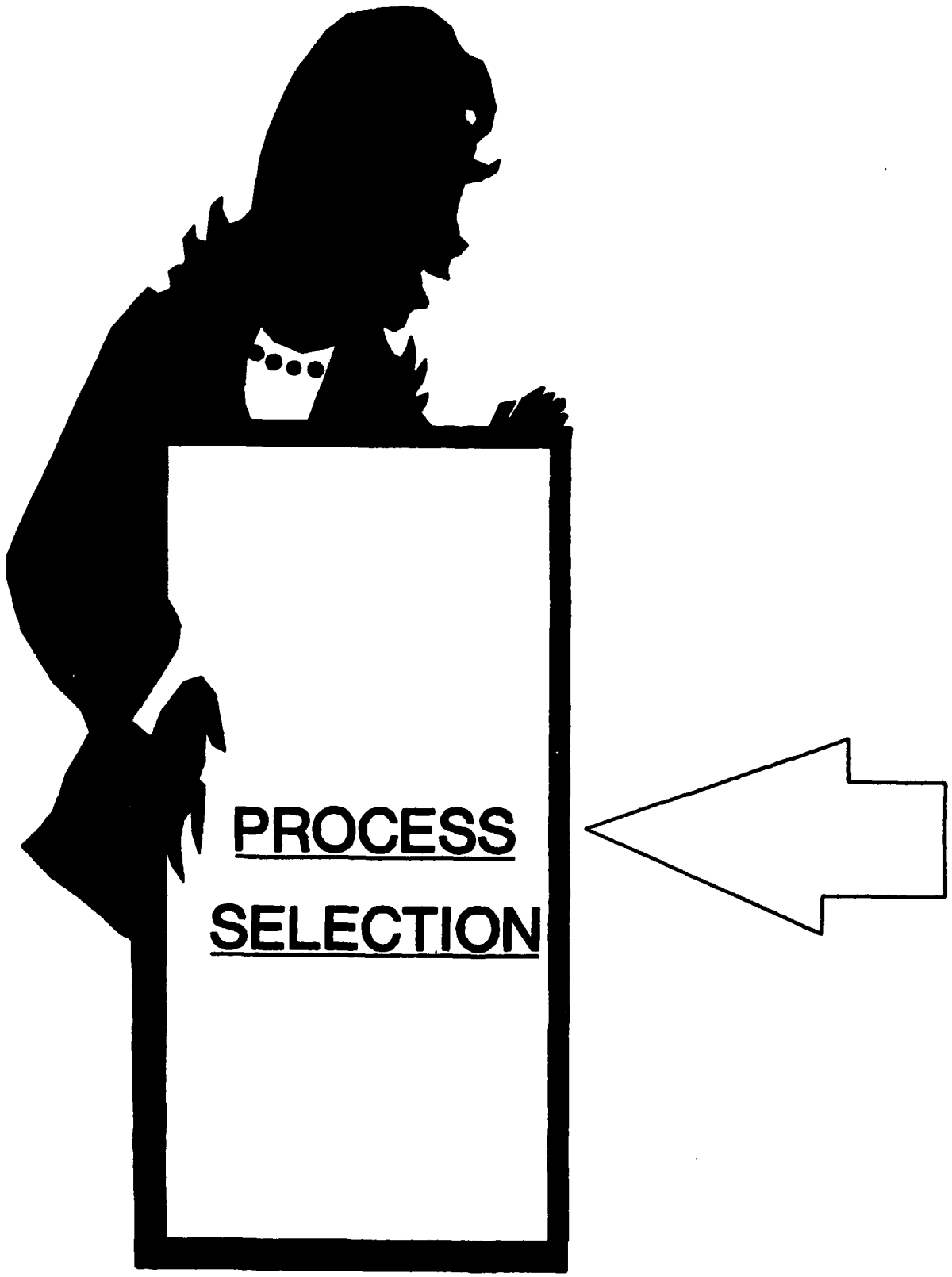
PERCEPTION

1. **RECOGNITION** - relating new information to what is already known.
2. **INTERPRETATION** - putting new information into a form you can recognize.
3. **EXPECTATION** - There is a tendency to get what you expect to get. To expand your horizons, don't limit your expectations.


PROCESS
APPROACH

DLSC
PROCESS REVIEW

- Select process
- Define process (Flowchart)
- Collect data
- Analyze data (Measurement)
- Adjust process as required
- Monitor process (Measure-ment)


PROCESS
SELECTION

SELECT PROCESS

- Directors select candidates for SPARC review
  - 11 Major Processes
  - 70+ Pulse Points (Sub-Processes)
- Identify SPARC members
  - Request members
  - Assess skills
    -- Train as needed
  - Develop Team Plan of Action

SPARC MEETING CHECKLIST

This checklist is designed to ensure that SPARC meetings follow a standardized and methodical approach to a process review. Although the steps should be followed in sequence, there is no requirement to accomplish a certain number of steps in any particular meeting. In all cases, a TQM Meeting Log must be completed to document what was accomplished at the meeting.

1. Introduce members and their roles. (LQ)_____
   NOTE: Charge all time spent on SPARC activities to JON ØLM924.

2. Provide TQM principles and definitions (can use videotapes, handouts, etc.). NOTE: This step can be done at any meeting as additional or new TQM information becomes available. (LQ)_____

3. Distribute SPARC Skills Checklist to all members. _____

4. Review checklist results to determine training needed. _____

5. Provide training as needed. (LQ)_____
   NOTE: Those already trained may not be required to attend meetings where training occurs.

6. Develop team Plan of Action. _____

7. Present Plan of Action to management. _____

8. Review flowchart for accuracy and completeness. _____

9. Identify risk areas in process flow. _____

10. Identify data to be collected and who will collect it (e.g., regulations, reports, functional descriptions, procedures, audit findings, etc.). _____

11. Rate the process using the Process Assessment Criteria. _____

12. Analyze the process.
    a. Break down steps in flowchart to determine duplication, etc. _____
    b. Determine problem areas using statistical techniques. _____
    c. Complete draft Process Analysis Sheet. _____
    d. Finalize Process Analysis Sheet with customers (e.g., visits, calls, letters, etc.). _____

13. Determine immediate improvements that can be made to the process.
    a. Develop Fact Sheet for approval of recommendations, at the lowest level possible, for the particular improvement. _____
    b. Present to ESG any recommendations requiring cross directorate approval. _____
    c. Prepare MIPs for improvements where significant tangible/intangible benefits are realized. _____

14. Adjust the process and supporting documentation as required (e.g., flowchart, IOPs, pulse point measurements, etc.). _____

15. Develop Final Report. _____
NOTE: Report must recommend measurements to be used to monitor the health of the process.

16. Prepare presentation of findings and recommendations to appropriate approval, authority (e.g., directorate level if no impact on other directorates). _____

17. Prepare presentation of results and lessons learned for TQM Working Group and Executive Steering Group. _____

18. Develop TQM Action Record for recommendations which will be implemented in the future. _____

19. Meet at least monthly to review the monthly measurements in the Decision Support System and to update TQM Action Record for any open recommendations. _____
NOTE: Every six months the SPARC will fill out the *Process Assessment Criteria* again to ensure the process still meets customer requirements.

GENERIC REQUEST FOR SPARC MEMBERS
(E-MAIL)

SUBJECT: SPARC TEAM MEMBERS

TO: _____, _____, _____
(Director(s))

CC: _____, _____, _____
(Supervisor(s) of area)
(Director of sender)

(Type message below)

I am the process owner of DLSC-___ SPARC_____.
(title)

Supplier(s)/Receiver(s) to my process are DLSC-___, DLSC-___and DLSC-___. Please provide names of team members (primary and alternate) from your area to _____, DLSC-___, x_____, by _____. At least
(name) (5 days)
one person from each area listed above is necessary. I will contact these people as to date and time of first meeting.

SPECIFIC REQUEST FOR SPARC MEMBERS
(E-MAIL)

SUBJECT: SPARC TEAM MEMBERS

TO: _____, _____, _____
(Director(s))

CC: _____, _____, _____
(Supervisor(s) of area)
(Director of sender)
(Person being requested)

(Type message below)

I am the process owner of DLSC-___ SPARC_____.
(title)

Supplier(s)/Receiver(s) to my process are DLSC-___, DLSC-___and DLSC-___. Please provide names of team members (primary and alternate) from your area to _____, DLSC-___, x_____, by _____. At least
(name) (5 days)
one person from each area listed above is necessary. I request that you consider sending _____ from your area. She is very knowledgable in this process and would be an asset to our team. With your approval, I will contact her as to date and time of the first meeting.

SPARC SKILLS CHECKLIST

This checklist is to be used to assess the knowledge, skills and abilities (KSAs) of each individual member of a SPARC.

MEMBER _____

PROCESS _____

SKILL	YES	NO	HOW KSA ATTAINED
1. Knowledge of process			
2. Analytical Ability			
3. Problem Solving Ability			
4. Communication Skills			
a. Writing			
b. Speaking			
c. Listening			
5. EasyFlow Software			
6. SPC Charts (Statistical Process Control)			
a. Understand their use			
b. Understand what they mean and represent			
7. Quality Analyst Software			

SPARC MEETING LOG

PROCESS:

MEETING DATE: **TIME:**

ATTENDEES:

PURPOSE:

DISCUSSION: (Include any concerns)

FOLLOW-UP ACTIONS:

SAMPLE

SPARC MEETING LOG

PROCESS: Item Characteristics Management Systems Branch, DLSC-ZPD

MEETING DATE: 22 Jan 88 TIME: 1330-1430

ATTENDEES: M. Hill M. Dickman
G. Archie D. Rusan

PURPOSE: Obtain an understanding of the concept of Artificial Intelligence/Expert Systems and applications being developed at DLSC for potential in the area of Quality Assurance.

DISCUSSION:

Mr. Hill and Ms. Archie explained that the academic concept, artificial intelligence is being used to develop expert systems.

Ms. Archie stated that the software purchased by DLSC to develop expert systems is called GURU.

Ms. Archie explained that a potential area for development of expert systems is the knowledge base possessed by people near retirement.

Mr. Hill and Ms. Archie demonstrated the prototype expert system developed for cataloging FIIGs. The system went through the process that a cataloger would go through to assign a name and code to an item.

Ms. Archie said that a proposal was submitted to DLSC-L for a seminar on Expert Systems to be conducted on-site. (None of the DLSC-L supervisors were aware of the proposal at the 25 Jan 89 morning meeting.)

After the meeting, Ms. Rusan stated that an expert system might be used to write procedures. Other advantages include system generated flow charts and comparing relationships among procedures to avoid conflict.

FOLLOW-UP ACTIONS: Mr. Dickman will contact Ms. Archie to determine to whom the proposal was submitted so that it can be tracked within DLSC-L. Mr. Dickman and Ms. Rusan are identifying future data to be collected such as software documentation, programming workload/resources, capability, and the type of proposed seminar.

TEAM PLAN OF ACTION

1. **PROCESS**: (Title and Office Symbol)

2. **SPARC MEMBERS**: (Self-explanatory)

3. **BACKGROUND**: (Indicate who tasked the process review and provide a brief history.)

4. **PROBLEM STATEMENT**: (Describe any known problems in the process, include desired results and address areas to be examined for improvement.)

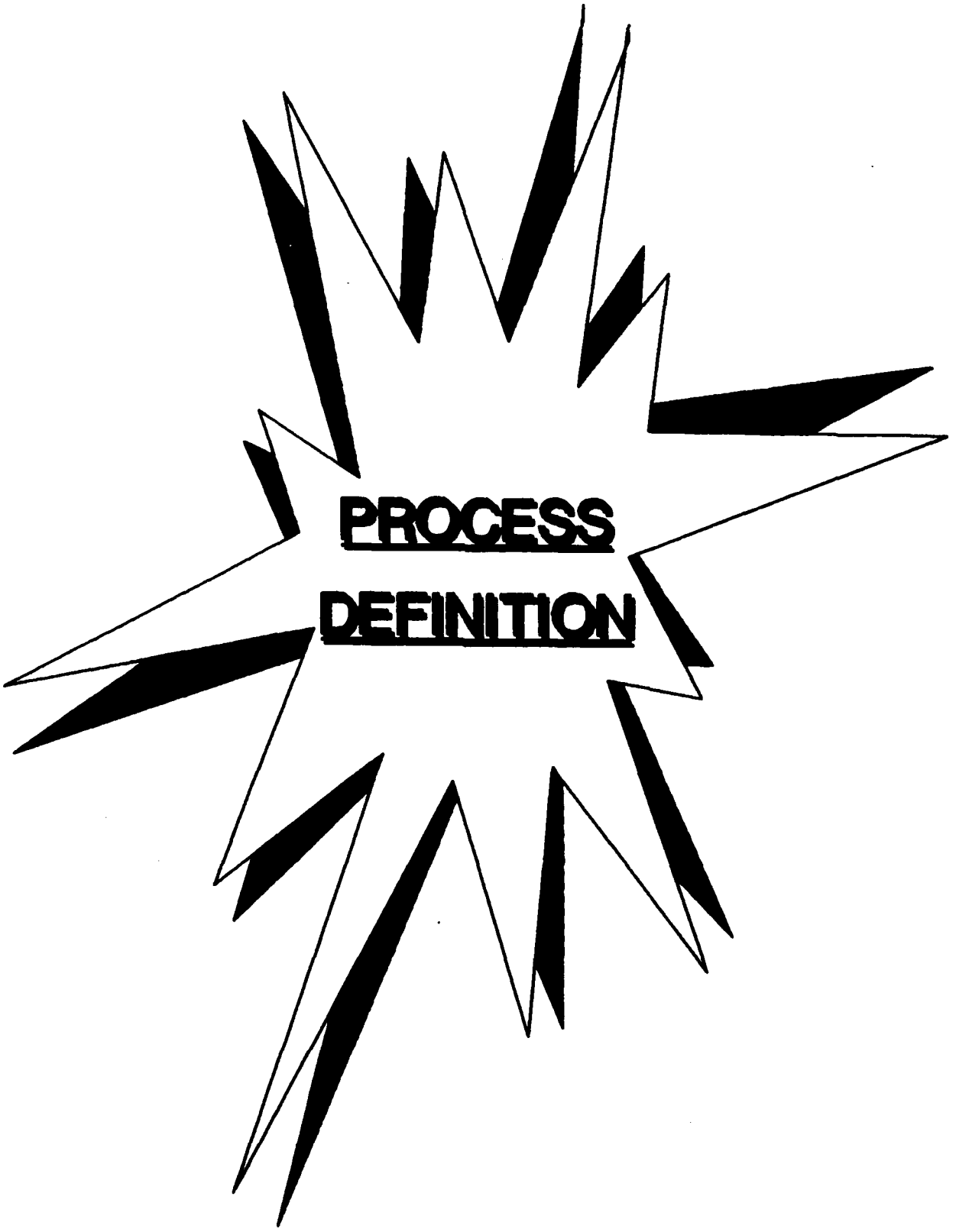
5. **SCOPE**: (Indicate the extent and range (parameters) of the process to include the organization(s) involved.)

6. **OBJECTIVES**: (Explain why this effort is being done, what is expected to be achieved as a result of this effort, and what the end product will be.)

7. **ASSUMPTIONS**: (Describe the conditions and/or restraints you will be working under.) NOTE: Periodic status reports will be presented to ESG.

8. **METHODOLOGY**: (Describe how the review will be conducted, the data collection method to be used (i.e., telephone interviews, face-to-face interviews, questionnaires, review of historical documentation, etc.) and the data analysis techniques.)

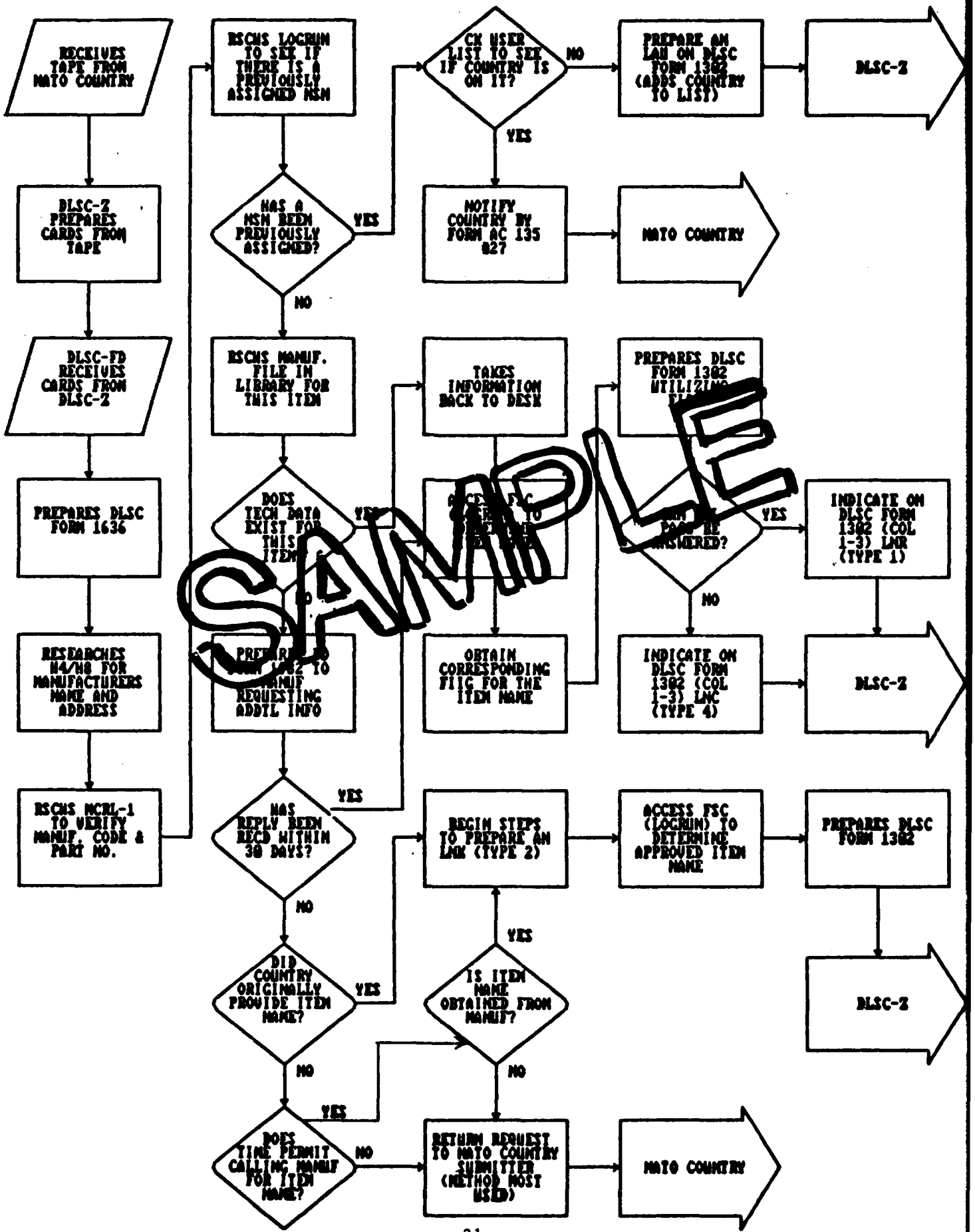
9. **RESOURCES AND TIME SCHEDULES**: (Describe the resources (people, equipment, materials) necessary to perform this effort. Indicate macro level milestones and projected timeframes.) NOTE: SPARC should meet a minimum of four hours per week. After reaching condition blue and completing the Final Report, meetings should continue monthly to review statistics and status of open recommendations.


PROCESS
DEFINITION

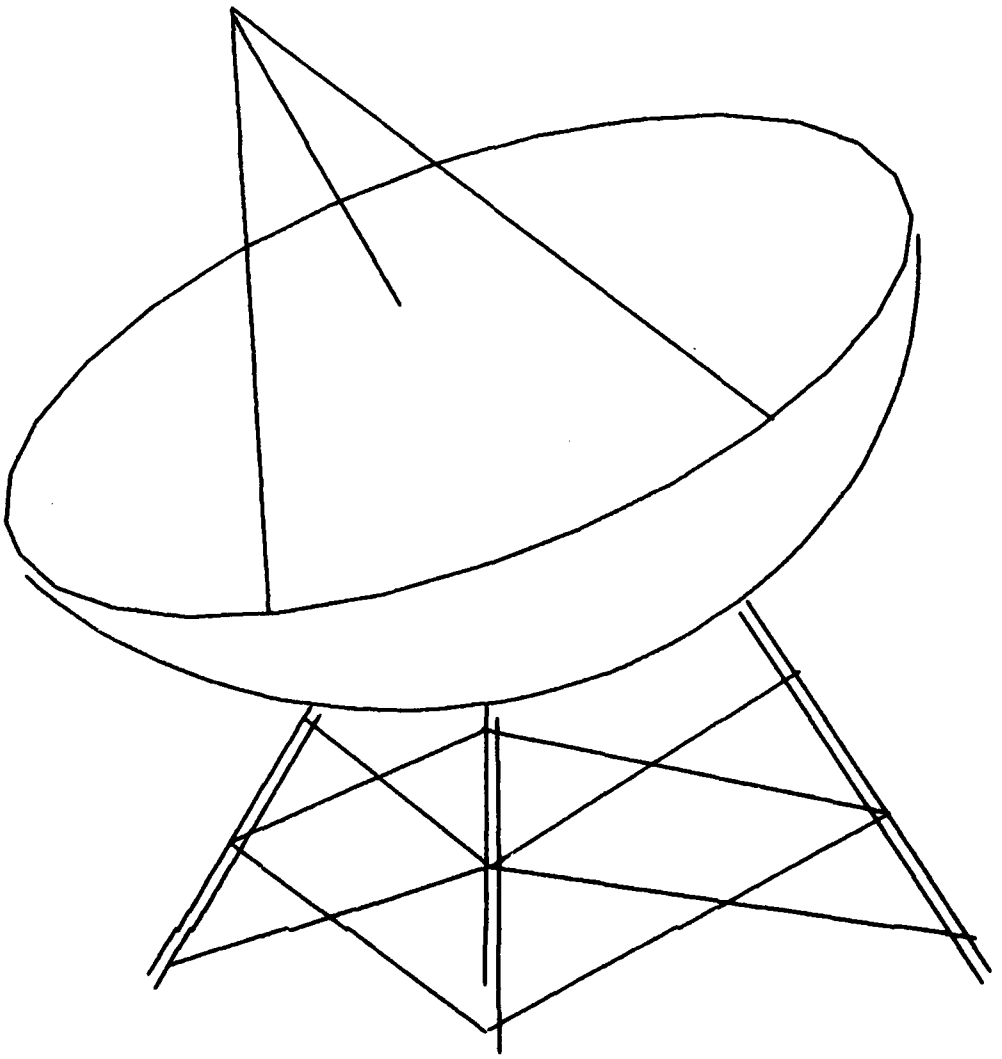
DEFINE PROCESS

- Flowchart
  - Inputs/outputs
  - Risk areas
- Identify regulatory guidance
- Identify existing data/reports

NATO ITEM IDENTIFICATION FLOW



DATA COLLECTION



COLLECT DATA

- Functional Descriptions
- Regulatory guidance
- Performance data/measurements
  - Decision Support System
- Deficiencies identified
  - TQM checklists, audit findings
- Supplier/customer requirements

FUNCTIONAL DESCRIPTION (FD) MATRIX

Jul 89

FD	PROCESSES										
	1	2	3	4	5	6	7	8	9	10	11
1. None										E	
2. Maintain Item of Supply	E	E	E		m	m	m	E		E	
3. Management Statistics	E	m	m	m	E	m	m	E	m	E	
4. Information Dissemination	E			E	E	m	m	E		E	
5. Cataloging Tools	E	E		E	E	m	m	E		E	
6. NATO	E	E			m	m	E	E		E	
7. Transaction Mgmt	E	E	m		m		E	E		E	
8. Production Mgmt	E	m	E	m	m		m	E		E	
9. Characteristics	E	E	E		m	m	m	E		E	
10. Data Base Mgmt System	m	E	m	E	E	m	m	E		E	
11. System Software Facilities	m	m	m	m	m	m		E		E	
12. Dictionary Mgmt	E	E	m	E	E	m	m	E		E	
13. Capacity Mgmt	m		m					E	E	E	
14. Testing Systems	E	m	m	m	m	E	m	E		E	
15. LOGRUN	E		E		E	E	m	E		E	
16. Data Retrieval	E		E		E	m	m	E		E	
17. Mailing Labels	E			E		m		E		E	
18. MEDALS	E				E	m		E		E	
19. Internal Mgmt	m	m	m	m	m	m	m	E	E	E	
20. Table Mgmt	E	E	E	E	E	m	m	E		E	

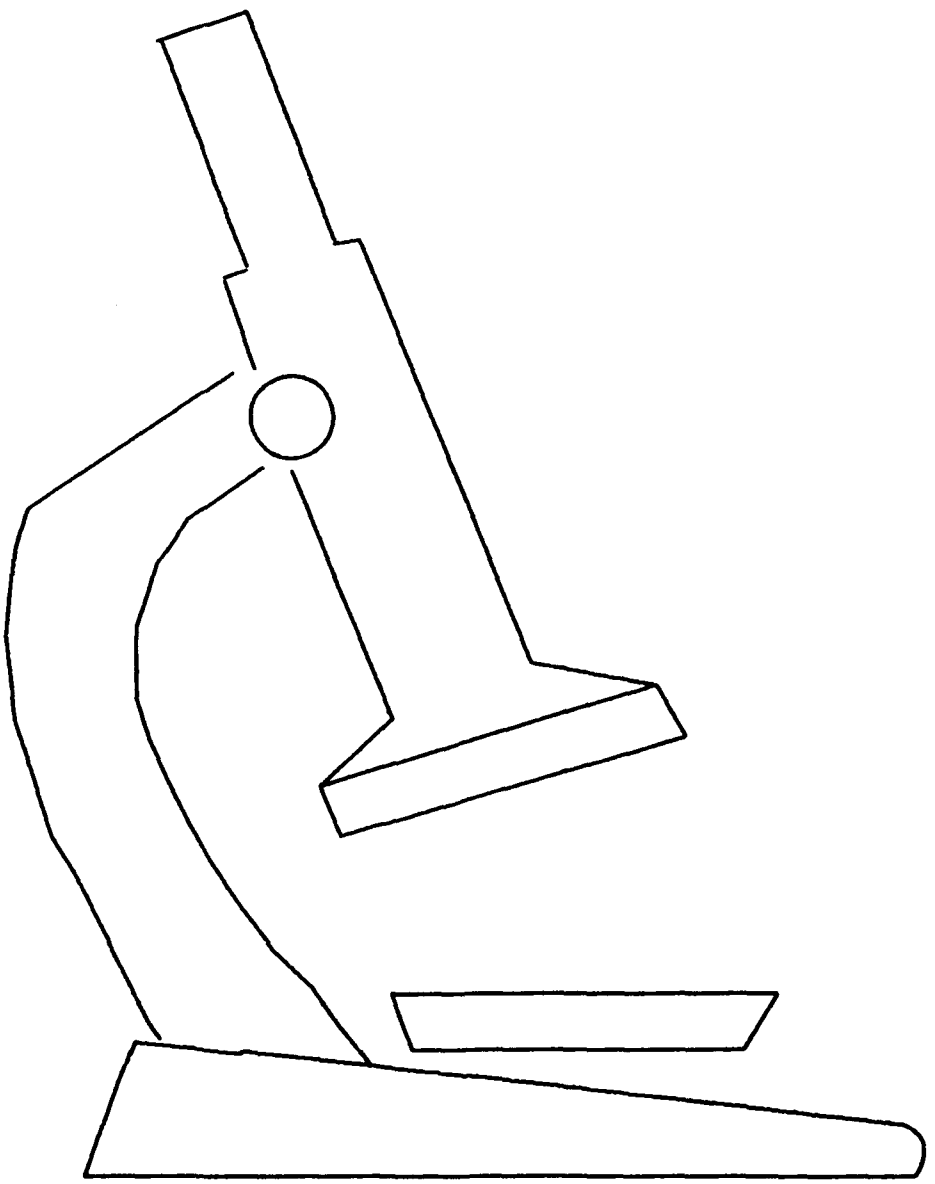
E = Extensive

m = Minimal

blank = None

Process	
1	Maintain DIDS
2	Maintain Existing Items/Process NSN Requests
3	Characteristics Data Management
4	Create and Publish Logistics Data
5	Distribute Log Data
6	Provide Customer Support
7	Perform NATO Cataloging
8	Telecommunications and System Oper.
9	Administration/Resource Management
10	Modernization
11	Overhead

DATA ANALYSIS



ANALYZE DATA

- Rate process
  - Process Assessment Criteria
- Analyze process
  - Process Analysis Sheet
  - Visit external suppliers/customers
- Measure process

PROCESS ASSESSMENT CRITERIA

The Process Assessment Criteria will be used to measure the operating condition of each process. The conditions are color coded from uncontrolled (red) to fully satisfactory (blue). As questions in one condition are answered 100% yes, the process will advance to the next condition. Once a process has reached the blue condition, this Process Assessment Criteria will be answered every six months to assure the stability of the process.

CONDITION RED

A process with the following characteristics is operating at CONDITION RED:

- Major uncontrolled areas
- Immediate corrective action needed
- Failing to meet customer requirements

CONDITION YELLOW

A process with the following characteristics is operating at CONDITION YELLOW:

- Major defects or problems
- Corrective action underway
- Some customer complaints

The process is operating at CONDITION YELLOW when Questions 1-10 can be answered YES and Question 11 can be answered YES or left unanswered.

	YES	NO
1. Does the process have a name?	___	___
2. Does the process have an owner who accepts and understands ownership responsibility?	___	___
3. Have the process boundaries been defined in writing?	___	___
4. Has a process flow been prepared and documented?	___	___
5. Have risks been identified?	___	___
6. Have the resources and personnel in the process been defined?	___	___
7. Have the customers been identified?	___	___
8. Have the customer requirements for the outputs been specified?	___	___
9. Have the suppliers been identified?	___	___
10. Have the supplier inputs been specified?	___	___

Answer the following question **only** if material weaknesses, internal/external audit findings or deficiencies from other sources (e.g., TQM Checklists, Internal Management Control Reviews) have been identified:

11. Is action being taken to correct any any weaknesses that have been identified?	___	___

CONDITION GREEN

A process with the following characteristics is operating at CONDITION GREEN:

- Minor defects or problems
- Improvements being made
- Meets most customer requirements

The process is operating at CONDITION GREEN when Questions 12-23 can be answered YES, and Question 25 can be answered YES or left unanswered.

		YES	NO
12.	Do the owner and customers agree on what the process can reasonably deliver?	___	___
13.	Are the customer requirements documented on a Process Analysis Sheet maintained by the process owner?	___	___
14.	Are the customers satisfied with what the process can deliver?	___	___
15.	Has the information in #12 - #14 been communicated to the SPARC and the personnel within the process?	___	___
16.	Have personnel within the process initiated a Plan of Action for quality improvements?	___	___
17.	Are quality improvement methods being applied at SPARC and Working Group levels to refine the process flow, procedures and tasks?	___	___
18.	Is a measurement tool such as a control chart being used to ensure that the process is staying within the process limits?	___	___
19.	Has the measurement in the Decision Support Support System (DSS) been adjusted to reflect identified customer requirements?	___	___
20.	Are the measurements being used as feedback for ongoing quality improvement and as a communication vehicle to the personnel within the process?	___	___
21.	Have the customers specified their future requirements?	___	___
22.	Does the owner have a mechanism for identifying the impact of future requirements on the process?	___	___

	YES	NO
23. Have the owner and the customers agreed as to how the process must be adapted to meet future requirements?	___	___
24. Have future customer requirements been communicated to those responsible for modernization planning?	___	___

Answer the following question **only** if internal audit findings have been identified:

	YES	NO
25. Is action being taken to correct any internal audit findings?	___	___

CONDITION BLUE

A process with the following characteristics is operating at CONDITION BLUE:

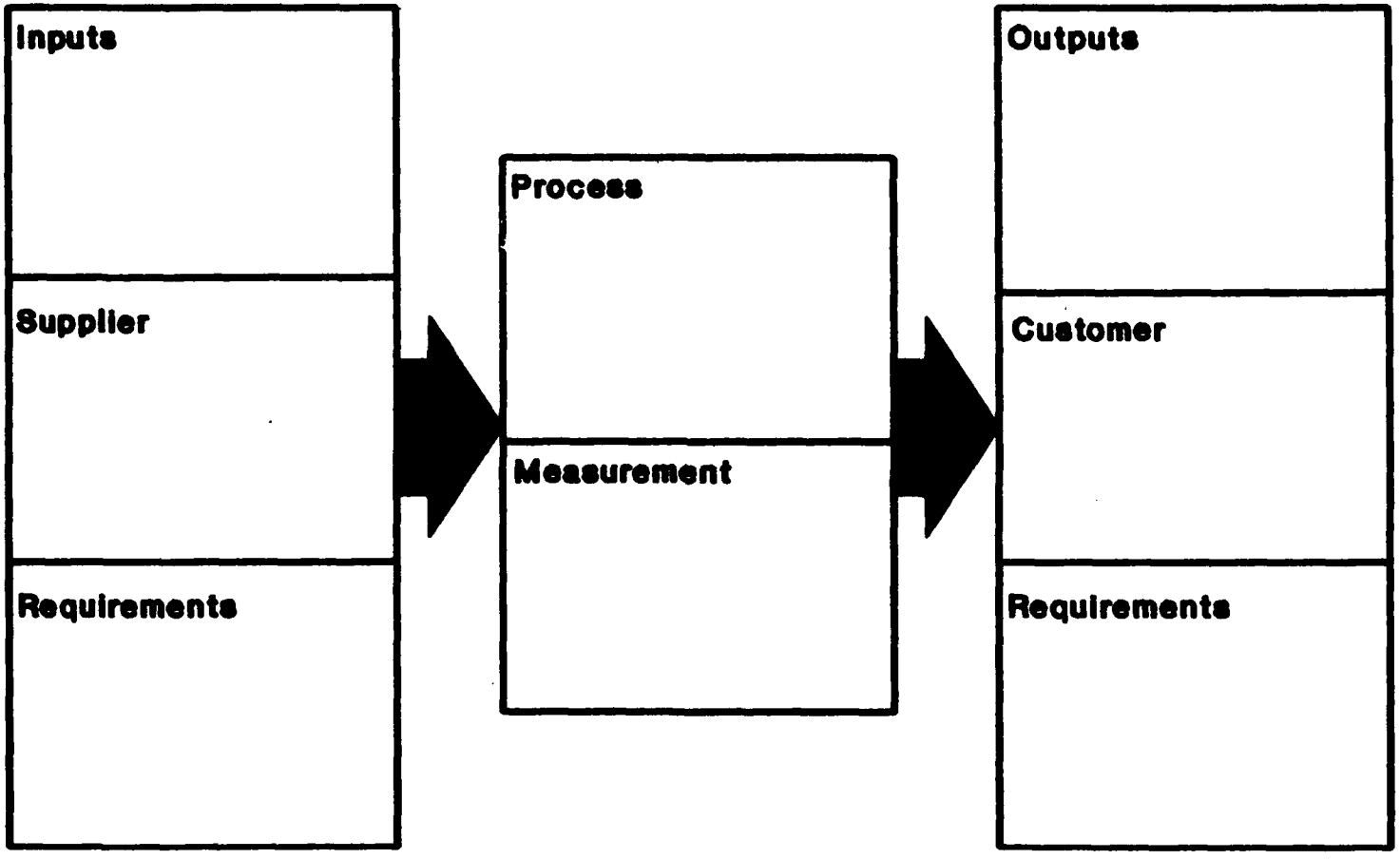
- Fully satisfies customer requirements
- No significant problems
- Customers express satisfaction

The process is operating at CONDITION BLUE when all of the following questions can be answered YES:

	YES	NO
26. Has the Plan of Action for quality improvements been successfully completed?	___	___
27. Have improvements been made to the process with tangible/intangible results realized?	___	___
28. Have the customers acknowledged that the outputs of the process are satisfying the established requirements?	___	___
29. Have the owner and the customers agreed that no significant operational inefficiencies are anticipated?	___	___
30. Has the process undergone an independent review with a satisfactory rating in all areas and did the reviewer assess the the process as fully satisfying customer requirements?	___	___
31. Is the process scheduled for reassessment?	___	___

PROCESS ANALYSIS SHEET

DLSC COMPONENT



PREPARED BY	EXTENSION	DATE

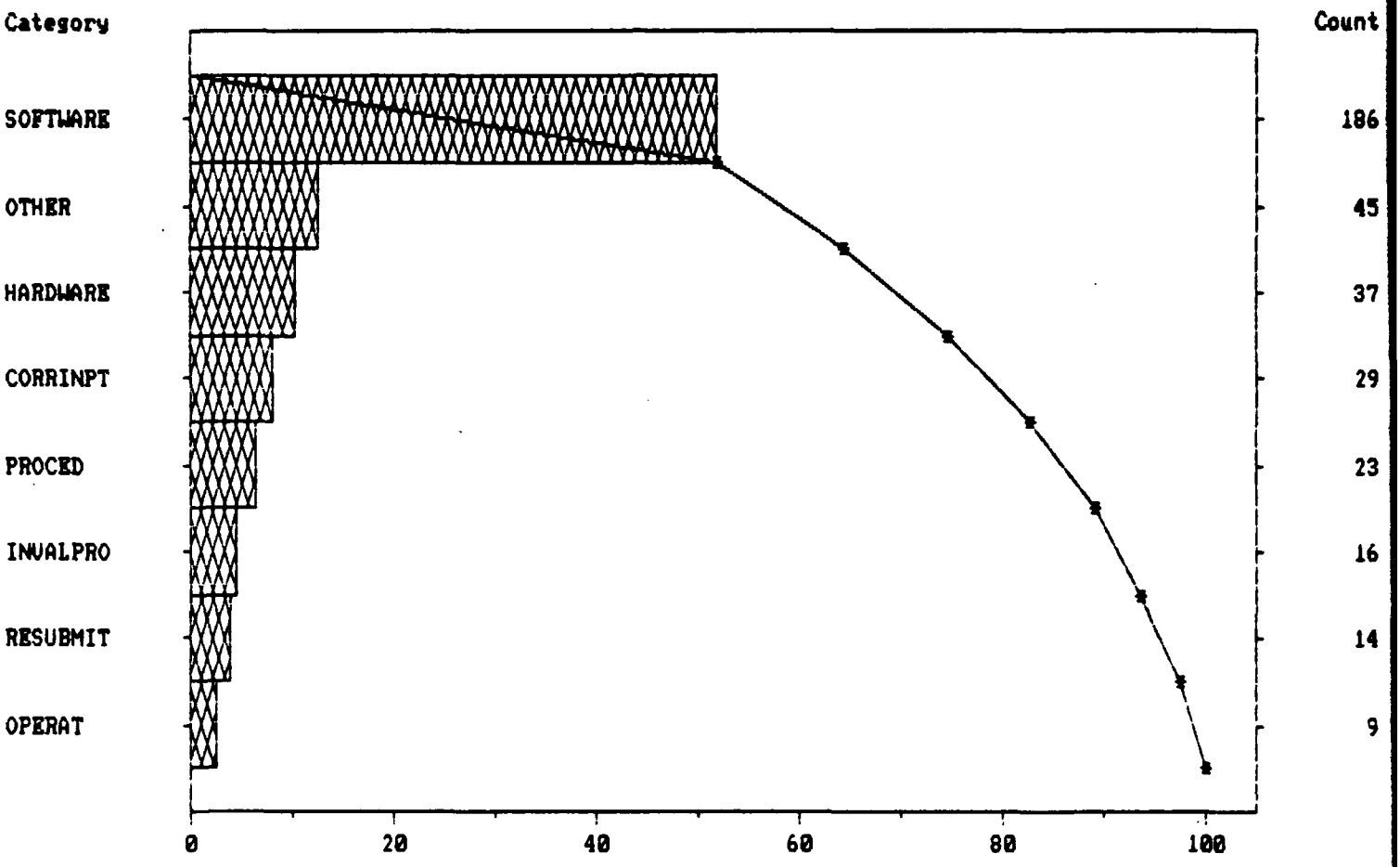
Approved: _____

_____

_____

SAMPLE MEASUREMENT

CATEGORY OF PROBLEM RESOLUTION
1 APRIL - 31 AUGUST 1988



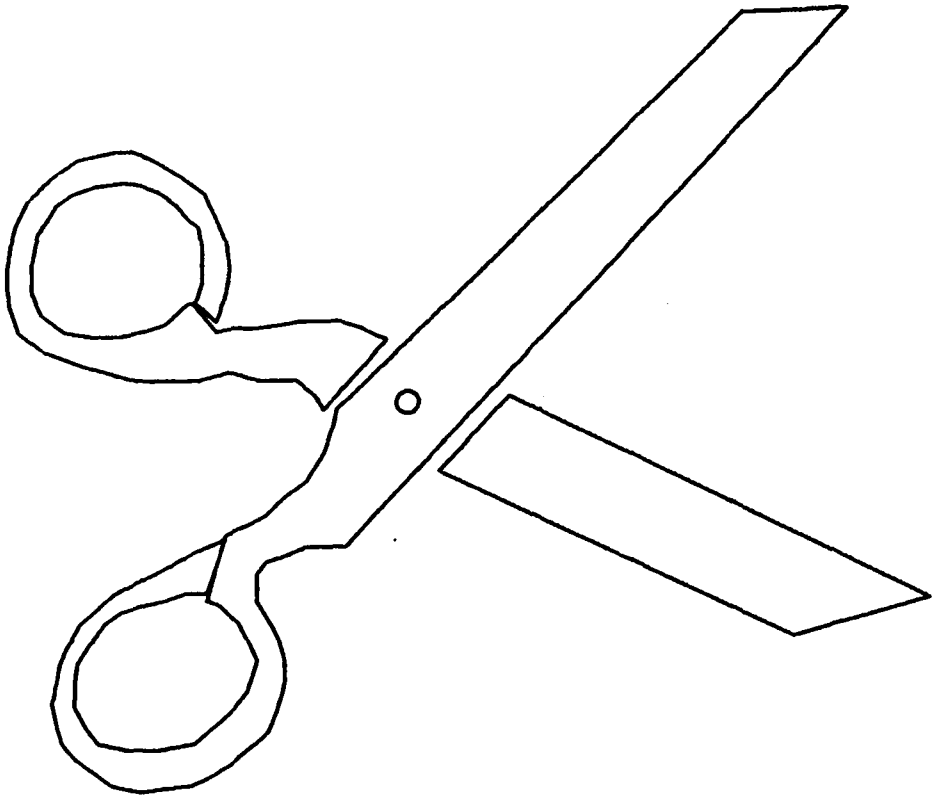
CATEGORY OF PROBLEM RESOLUTION
Comment: CHART 6 Pareto

Subgroups 1 to 1

Cell	Cell value	Frequency	%	Cumulative	%
1	SOFTWARE	186	52.0	186	52.0
2	OTHER	45	13.0	231	64.0
3	HARDWARE	37	10.0	268	75.0
4	CORRINPT	29	8.0	297	83.0
5	PROCED	23	6.0	320	89.0
6	INVALPRO	16	4.0	336	94.0
7	RESUBMIT	14	4.0	350	97.0
8	OPERAT	9	3.0	359	100.0

This chart depicts category of problem resolutions which identifies the actual problem that was fixed. The highest number 186 (52%) was Software, Other with 45 (13%) and Hardware with 37 (10%). Currently, the software category of problem resolution is subdivided into four subcategories; the breakdown is as follows: Software - 4; Agenda - 5; WFL/JCL - 43 or (23%); Program - 133 or (71%); and SCR/DLA 558 - 1. 16 or (4%) reports were classified Invalid Problems and appeared for the first time as a problem resolution category.

PROCESS ADJUSTMENT



ADJUST PROCESS

- Recommend improvements
- Implement at lowest level
  - Fact Sheet
- Develop final report
  - Cost savings
  - Lessons learned

SPARC FACT SHEET

(For recommendations which can be approved for quick implementation within a directorate.)

SUBJECT: Name of process.

BACKGROUND: When SPARC began review of the process. Types of data collected and analyzed.

DISCUSSION: Findings and observations with supporting statistical or other types of data.

CONCLUSION: What positive impact will occur if improvements or changes are made?

RECOMMENDATIONS: Specific changes or solutions which should take place to improve the process and/or correct any problems. Samples of proposed revisions can be cited here as attachments.

	Reviewed _____
	Reviewed _____
Prepared by _____	Approved _____
Date Prepared _____	Date Approved _____

FINAL REPORT

PROCESS: (Title and Office Symbol)

SPARC MEMBERS: (Self-explanatory)

SCOPE: Indicate extent and range (parameter) of study to include the organization(s), programs, activities, and functions covered.

TIMEFRAME: Start and end date of SPARC review.

PURPOSE: Define why the study is being conducted and what the anticipated or the desired results are.

FINDINGS: List all data which was analyzed or evaluated and considered to be of interest, concern, or use to the entity. This data is a logical pulling together of information and arriving at conclusions on the basis of the sum of the information about an organization, program, activity, function, or condition. This data should include a description of noteworthy accomplishments as well as deficiencies. When deficiencies are discovered, a determination must be made as to the materiality of the deficiency (DLSC Form 1742, Material Weakness Determination).

RECOMMENDATIONS: Identify actions needed to improve problem areas noted in the findings and to improve operations. Include specific actions, offices involved, timeframes, resource requirements, and expected results, if known.

APPENDICES: Include graphs, tables, surveys, documents, DoD IG/GAO Findings, TQM Self-inspection Checklists, Risk Assessments, Internal Management Control Reviews, etc.

BENEFITS: Tangible/Intangible

LESSONS LEARNED: Identify any internal or external policies, procedures or regulations that should be considered for development or changes as a result of this study/review. Identify the action and action office, services, or Agency.

CONCURRENCE/APPROVAL: Concurrence of all Directorate/Offices that are involved in or impacted by the issue is required. Signature of approving official at Command or Directorate/ Office level is required.

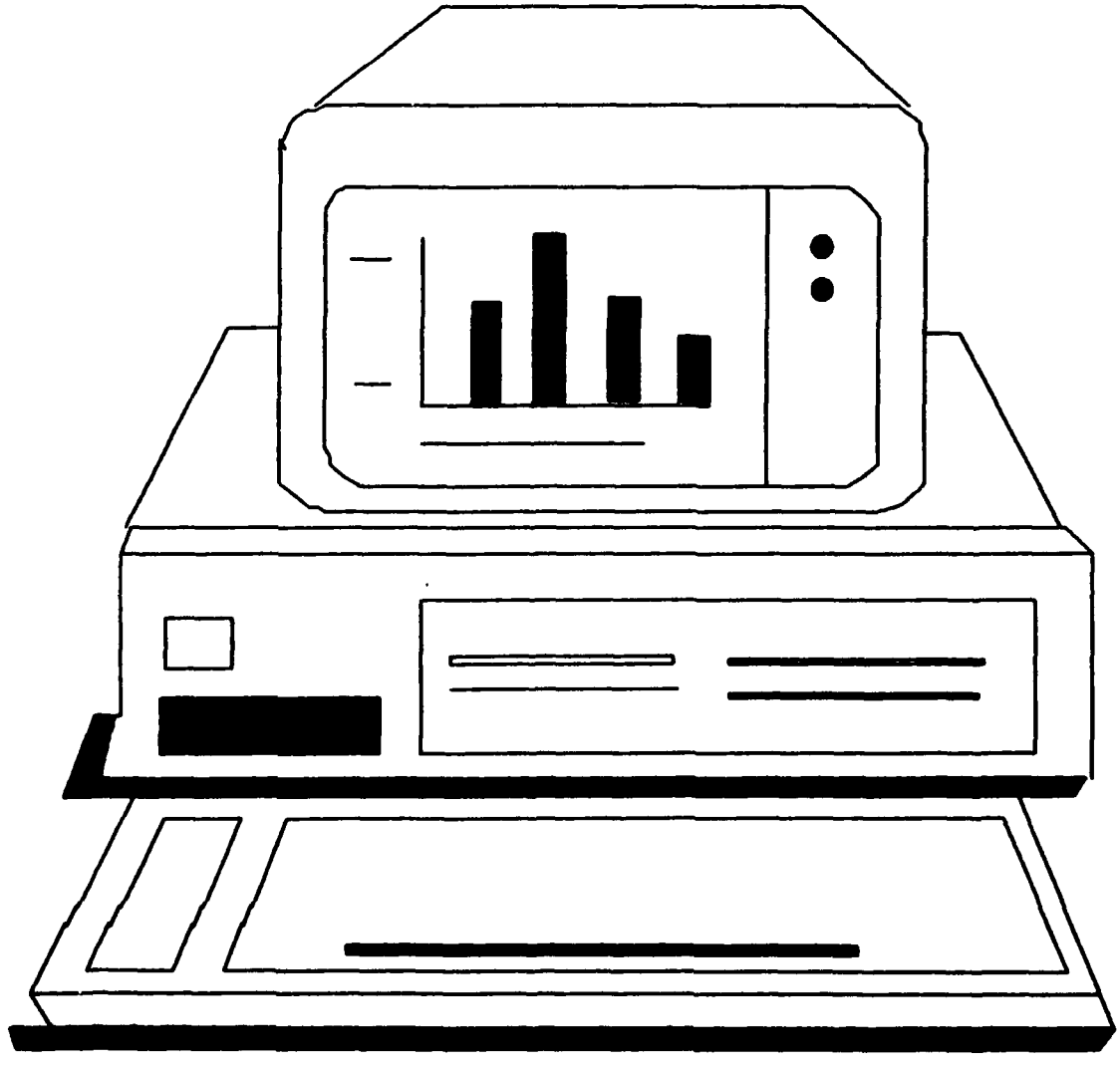
CONCURRENCE:

Office Symbol_____ Concur_____ date_____
Office Symbol_____ Concur_____ date_____
Office Symbol_____ Concur_____ date_____

APPROVAL: _____ date_____

Command, Directorate/Office

MONITORING PROCESS



MONITOR PROCESS

- Track implementation
  - Central Data Base
- Monthly TQM Action Record
  - Update data base with status of recommendations
- Monthly measurement charts
  - Ensures process still in control
- Continuous SPARC review
  - Further enhancements
  - New technologies

TOTAL QUALITY MANAGEMENT ACTION RECORD

This record will be maintained by the process SPARC. An updated copy will be forwarded to the Quality Assurance Division (DLSC-LQ) each month until implementation is completed. This document will be used to update the TQM Action Record Database.

1. DIRECTORATE	2. RECOMMENDATION NO.	3. PROCESS

4. FINDINGS *(DEFICIENCY)*

5. ACTION TO BE TAKEN TO CORRECT DEFICIENCY AND PREVENT RECURRENCE

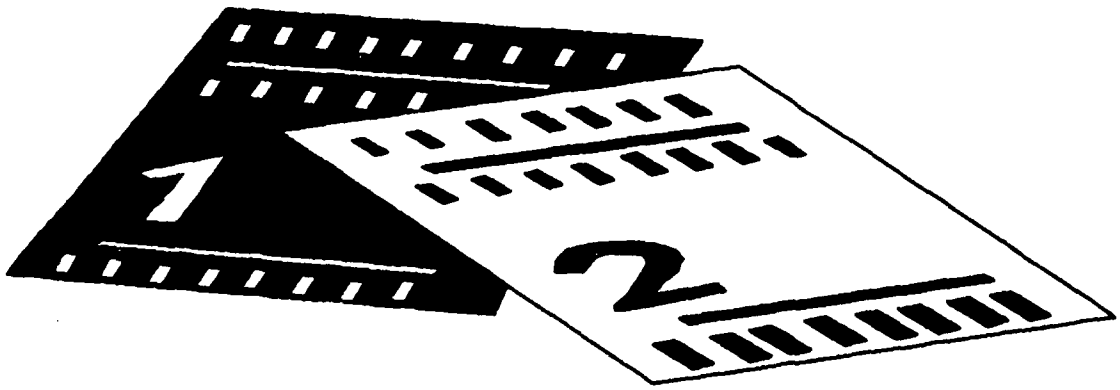
5A. ESTIMATED COMPLETION DATE

5B. ACTION OFFICER *(OFFICE SYM, EXT)*	6. RESPONSIBLE SUPR *(OFFICE SYM, EXT)*

7. CURRENT STATUS

8. PROCESS OWNER SIGNATURE *(OFFICE SYM, EXT)*	9. DATE

APPENDIX



TQM TOOLS AND TECHNIQUES

THE PROBLEM SOLVING PROCESS

1. Identify problems
2. Select problem
3. Analyze root cause
4. Identify possible solutions
5. Select solution
6. Test solution
7. Implement solution
8. Track effectiveness

INFORMATION GATHERING

1. **INTERVIEW** - obtain information by questioning people
2. **SURVEY** - examine or study something in a comprehensive way
3. **WORK REVIEW** - obtain information by looking at actual work
4. **MANAGEMENT REPORTS** - provide information by system generated and manually prepared reports.
5. **REFERENCE MATERIAL** - information obtained by reviewing written materials.

COMMUNICATING

SENDER - Know your subject - be prepared
Be organized
Be aware of your mannerisms
Look at your audience - have good eye contact
Speak on the audiences level - never talk down to them

MESSAGE - Should not be: ambiguous
too complex
too simple
irrelevant

RECEIVER - Find interest in the subject
Have an open mind
Don't be distracted - pay attention

FEEDBACK - Be appropriate
Constructive criticism - not all negative
Give something

BRAINSTORMING

Brainstorming is a technique for soliciting a quantity of ideas quickly in a non-critical work environment. It encourages teamwork and creativity.

Brainstorming accomplishes two purposes. It encourages the team members to work together in a cooperative fashion, and it generates a multitude of ideas in a relatively short amount of time.

GUIDELINES FOR BRAINSTORMING

1. State the problem or topic
2. Select a recorder.
   -Record ideas on flipchart
   -Reduce ideas to a few words
3. Take turns - free wheeling
   -Be imaginative - play off ideas
4. No comments, criticism, discussion, or praise
   -Any idea is acceptable
5. Continue building ideas until several members pass
6. 'GreenLight' for spontaneous ideas
7. Clarify, discuss, and/or combine ideas
8. If appropriate, set time limit.

WORKFLOW DIAGRAM/STEP ANALYSIS

A workflow diagram/step analysis systematically breaks down a work process into its component parts enabling the problem solver to see the tasks involved, and the suppliers to and the customers of a process step.

Develop workflow diagram/step analysis:
- To understand the whole picture
- To identify customers previously neglected
- To verify and clarify the work process
- To identify opportunities for improvement

ANALYZE ROOT CAUSE

A root cause is a major contributor to the existence of nonconformance. It is the element which must be improved upon to reduce nonconformance in a given area. In some cases the root cause may be made up of two or three smaller causes. The aim is to treat the major contributors of the problem, rather than the symptoms. If we treat the root cause (vital few) we will eliminate most of the problem.

CAUSE AND EFFECT ANALYSIS

Cause and effect diagrams are simplified, visual means which allow team members to examine, systematically, a large number of potential causes of a probable relationships among causes.

TYPES OF CAUSE AND EFFECT DIAGRAMS

1. Fishbone Diagram
2. Structure Tree

Fishbone Diagram

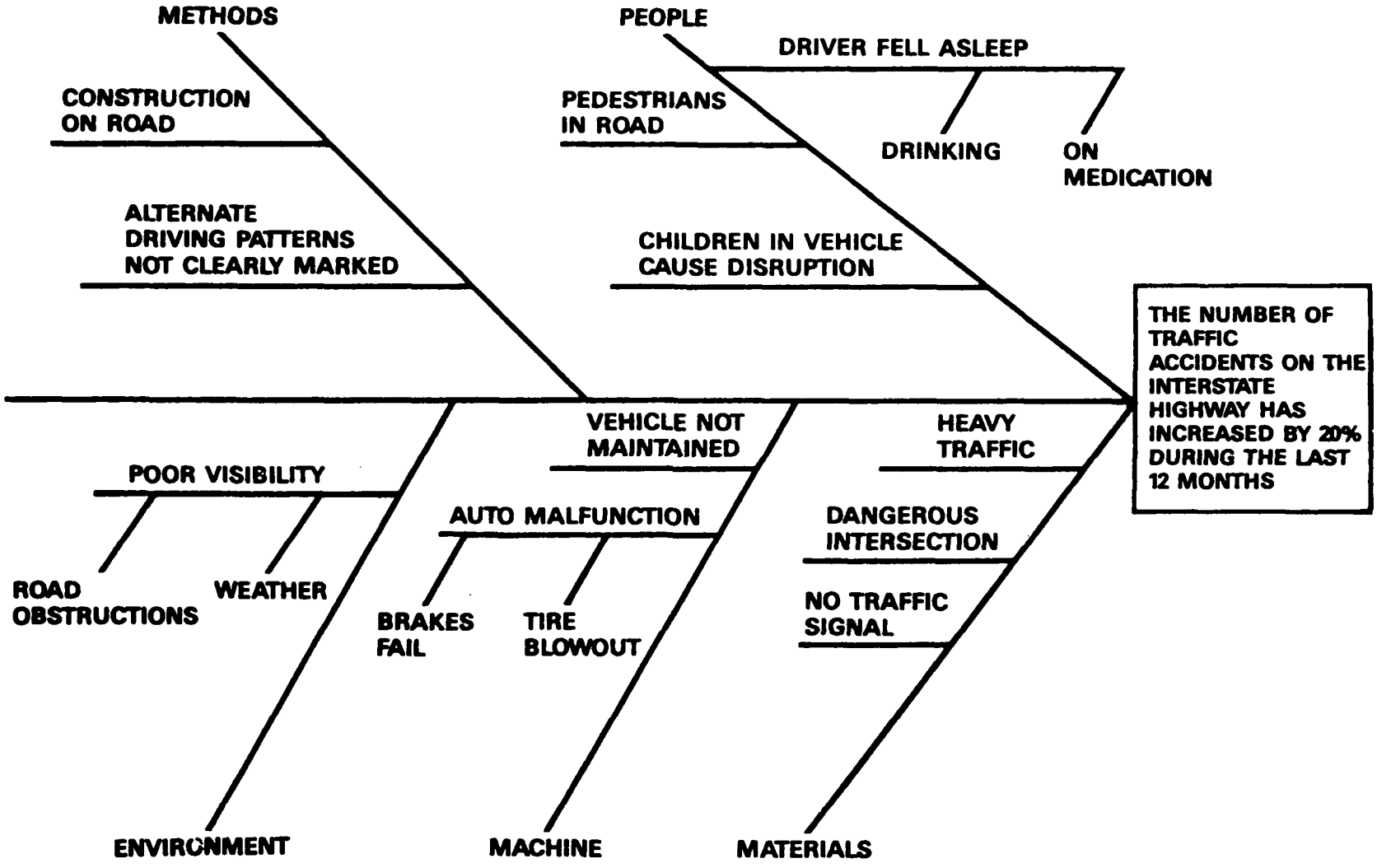
Description -- One cause and effect diagram is the ISHIKAWA or FISHBONE diagram. The inventor of this diagram, Dr. Kaoru Ishikawa, designed the diagram to resemble a fish skeleton, hence the name.

This diagram is designed to portray all the possible causes for the problem's existence and the relationship between the potential causes. We can define cause as those factors which make an effect (problem) occur.

Steps to Design a Cause and Effect Diagram*

1. Select a recorder.
2. State the problem (effect).
3. Decide on major categories of causes.
4. Brainstorm possible causes.
5. Refine the list of causes into subcategories. (Additional data gathering may be necessary.
6. Prioritize the list for most likely causes.

*These steps can be used to construct a fishbone or structure tree diagram.


METHODS
CONSTRUCTION ON ROAD
ALTERNATE DRIVING PATTERNS NOT CLEARLY MARKED
PEOPLE
DRIVER FELL ASLEEP
PEDESTRIANS IN ROAD
DRINKING
ON MEDICATION
CHILDREN IN VEHICLE CAUSE DISRUPTION
THE NUMBER OF TRAFFIC ACCIDENTS ON THE INTERSTATE HIGHWAY HAS INCREASED BY 20% DURING THE LAST 12 MONTHS
VEHICLE NOT MAINTAINED
HEAVY TRAFFIC
POOR VISIBILITY
AUTO MALFUNCTION
DANGEROUS INTERSECTION
ROAD OBSTRUCTIONS
WEATHER
BRAKES FAIL
TIRE BLOWOUT
NO TRAFFIC SIGNAL
ENVIRONMENT
MACHINE
MATERIALS

Structure Tree Diagram

The structure tree, like the fishbone diagram, is a method for developing a picture of the relationship between an effect and its cause(s).

The structure tree diagram is basically the same as the fishbone diagram in its construction. A "tree" branches into areas the team considers most likely to contain causes. The structure tree is of most benefit when there are a limited number of causes to deal with. Also note that the structure tree can be developed from top to bottom rather than right to left. The same steps to design the fishbone diagram would be used for the structure tree.

EXAMPLE OF STRUCTURE TREE